

-8-

**REMARKS**

Claims 1-4, 9, 11-18, 35 and 36 are pending in the captioned application. Claim 36 has been allowable, but stands objected to as being dependent from a rejected base claim. The other pending claims stand rejected. Among the pending claims, there are three independent claims: claims 1, 12, and 18.

The specification is objected to as a result of allegedly new matter entered with the amendment dated September 30, 2004. Claims 18 and 35 stand rejected under 35 U.S.C. §102. Claims 1-3, 6-8, 11, 13-15, 18 and 35 stand rejected under 35 U.S.C. § 103.

**Amendment to the Specification**

The specification has been amended to remove the allegedly new matter.

**Rejection of Claims 18 and 35 Under 35 U.S.C. 102**

Claims 18 and 35 stand rejected under 35 U.S.C. 102 as being anticipated by PCT Publication WO 9742462 to Martinez-Tovar ("Martinez-Tovar (PCT)"). The rejection is based on the Examiner's refusal to acknowledge the exclusionary effect of the "consisting essentially of" language in claim 18, asserting that "absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, 'consisting essentially of' will be construed as equivalent to 'comprising'." The Examiner cites PPG Industries Inc v. Guardian Industries Corp, 48 USPQ2d 1351 at 1355 (Fed. Cir. 1998) ("PPG") in support of this assertion, quoting from that case, "PPG could have defined the scope of the phrase 'consisting essentially of' for purposes of its patent by making clear in its specification what it regarded as constituting a material change in the basic and novel characteristics of the invention."

The Applicant respectfully submits that the Examiner is mis-apprehending the ruling of the PPG case and is imposing unjustified requirements on the rejected claims, and that the application and prosecution of this application provide ample support for the 'consisting essentially of' language of claim 18.

The quotation above notwithstanding, the PPG court gave weight to the 'consisting essentially of' limitation. The court also acknowledged a patent applicant's right to provide its own definition of "consisting essentially of" in the patent application or prosecution, saying "In Water Technologies Corp v. Calco Ltd., 850 F.2d 660, 666, 7 USPQ2d

-9-

1097, 1102 (Fed. Cir. 1988), for example, this court looked to the prosecution history of a patent to determine whether an unlisted ingredient was excluded from the scope of a "consisting essentially of" claim." PPG, 48 USPQ2d at 1355.

The subject specification discloses a semiconductor bridge device having a layer of titanium without tungsten and explains the energy-saving advantages of using titanium without a layer of tungsten, thus indicating the basic and novel characteristic of the invention to support the "consisting essentially of" phrase in claim 18. Furthermore, the Applicant has repeatedly asserted and now maintains that the phrase "consisting essentially of" signals the exclusion of tungsten and some other metals from the bridge section of the semiconductor material to reduce the energy requirement for using the claimed device. The scope of other excluded materials (and other permitted materials to which the claim remains open) would be discernable by one of ordinary skill in the art on the basis of the specification and prosecution of this application. Therefore, ample support has been provided for "consisting essentially of". Since the cited reference (Martinez-Tovar (PC1)) only shows igniter devices having a layer tungsten on the bridge section that would be excluded by the "consisting essentially of" limitation of claim 18, the stated ground of rejection is respectfully traversed.

Rejection of Claims 1-3, 6-8, 11, 13-15, 18 and 35 Under 35 U.S.C. 103

The above-identified claims stand rejected under 35 U.S.C. 103 as being unpatentable over U.S. Patent 4,976,200 to Benson et al. in view of DE19721929 to Weiss ("Weiss '929").

Benson et al. discloses an initiation device comprising a bridge of semiconductor material (silicon bridge 20) on which a layer of tungsten (17) has been deposited.

A translation of Weiss '929 was not included with the office action, but the Applicant has obtained a machine translation thereof, attached hereto. Weiss '929 appears to disclose an air bag initiator consisting of a hafnium hydride layer deposited directly on an insulating layer of silicon dioxide, which is not a semiconductor material. The passing reference to titanium in the English language abstract that accompanied the Weiss '929 reference does not appear to reflect the content of the reference and so should not be relied upon. Weiss '929 thus fails to show an igniter device with a semiconductor bridge or a layer of titanium thereon.

-10-

The cited references fail to render obvious the rejected claims for several reasons. First, even if the references are viewed together, the absence of any mention of titanium means that if combined, the applied references fail to enable, teach, or even suggest a device comprising a semiconductor bridge covered with titanium, as recited in the rejected claims. Second, the Benson et al. device shows a silicon bridge covered with a metal, whereas Weiss '929 discloses only a hafnium hydride bridge on an insulating layer ( $\text{SiO}_2$ ), and the Examiner has failed to show the source of a motivation to apply a hafnium hydride bridge, or the combination of hafnium hydride and  $\text{SiO}_2$  to a device comprising a silicon bridge covered by a metal (tungsten). The difference between the underlayer of  $\text{SiO}_2$  and that of silicon is significant, as reflected in the first and second paragraphs of Weiss '929. Third, the second paragraph of Weiss '929 speaks of the disadvantages of the device disclosed by Benson et al., thus teaching away from the combination asserted by the examiner.

For these reasons, the applied references fail to render obvious an igniter as defined in claim 1 or 18, both of which define igniters having a bridge made from a semiconductor material on which titanium is disposed without tungsten.

#### Claim 36

Claim 36 was objected to as being dependent from a rejected base claim. This claim has been amended to place it in allowable form.

**Thin film more igniter for pyrotechnic material especially OF airbag****Description OF DE19721929**

The invention concerns a thin section ignition element for pyrotechnic effect masses.

Made of US 4.708.060 is an electrical ignition means, from which the the subject of the patent claim 1 proceeds, admits, with which as semiconductor material Polysilizium is used, whose effect principle of thermal nature is. Comparable here the execution is as widerstandsbruecke. In the ignition moment the energy entry is made by the training of a thin plasma. For this it is to be heated up necessarily the material over its melting point, which is with Polysilizium over 1680 DEG C. The energy entry necessary for it is however comparatively high.

Another variant of a bridge lighter of that the the subject of the secondary claim 2 goes out, is well-known from US 4.976.200. Here a thin tungsten layer on a thin intermediate layer made of silicon is separated, the silicon layer serves thereby as electrical isolation layer for the substrate. This intermediate layer affects by its negative temperature coefficients themselves actively the zuendvorgang. Thermal isolation to the underlying substrate is here hardly given by the relatively high heat conductivity of the silicon.

Favourably for the available invention in accordance with secondary claim 2 on that is in the view the application of a thermal isolation layer under the ignition bridge layer, which prevents losses of energy by heat dissipation into the carrier substrate inside, so that the necessary zuendenergie becomes smaller. The gale trigger time and the necessary energizing voltage can be varied by the variation of the layer thickness of the thermal isolation layer and the variation of structure geometry according to.

Task of the available invention is it to develop a thin section ignition element which the coupling of chemical and thermal energy entry (plasma production) into a pyrotechnic layer made possible and which ignition of this layer causes, which a higher thermal stability regarding its material composition compared with other metal hydride layers and thus a high life duration ensures, with which further critical ignition parameters can be simply stopped such as gale trigger time, energizing voltage and the energy which can be spent for ignition by an appropriate dimensioning of structure geometry and the layer structure of the ignition element and which already functions within the range of fewer millijoules reliably.

This task is solved by the characteristics of the requirement 1 and/or the secondary claim 2. Favourable arrangements are entnehmbar the unteranspruechen.

The invention is more near described in the following on the basis by remark examples and associated designs.

Execution forms shown and the described are not to be understood as locking enumerating, but have rather an exemplary character for the description of the invention.

Show:

Fig. 1 HfHX layer ( $2 \geq x \geq 0.025$ ) separated and structures Fig. 1a on a carrier substrate with a thermally isolating inorganic or organic layer, as plan view without contact metallization, Fig. 1b as plan view with contact metallization and Fig. 1c as sectional view

Fig. separated and Fig. 2a structures 2 HfHX layer ( $2 \geq x \geq 0.025$ ) as plan view without contact metallization, Fig. 2b as plan view with contact metallization and Fig. 2c as sectional view on a carrier substrate,

Fig. 3 thermodynamically effective length l and width b of the ignition structure

Fig. 4 circuit diagram of the zuendstromkreises

Fig. 5 Hf IX layer ( $2 \geq x \geq 0.025$ ) separated and structures on a carrier substrate with a thermally isolating inorganic or organic layer and with directly applied pyrotechnic layer

It is characteristic that the hydrogenated hafnium layer 2 directly (semiconductor-process-compatibly) on one electrically and thermally isolating layer 3 (e.g. SiO<sub>2</sub>), which on the carrier substrate 4 (e.g. Si) is, separated. The widened contact areas 21 (see Fig. 1a) of the ignition layer to be able by means of aluminum layer or another layer from a high-conductive material 1 be metallized (see Fig. 1b and Fig. 1c), in order to facilitate a contacting. The dimensions of the contact areas 21 depend on the contacting conditions demanded in each case.

The hydrogenated hafnium layer 2 can be separated likewise directly (semiconductor-process-compatibly) on the carrier substrate 4 (see Fig. 2).

The described organization of the ignition element in form of the hydrogenated hafnium layer 2 offers the advantage that critical ignition characteristics, like gate trigger times and energizing voltages on the one hand directly by a change of structure geometry (length l, width b, see Fig. 3) in consequence of a variation of the electrical and thermodynamic characteristics of the metal hydride structure adjustable are additional and by the variation of the layer thickness D (see Fig. 1c) of the underlying thermally isolating layer 3, which makes the attitude for the heat dissipation possible into the carrier substrate 4.

The ignition takes place via creation of an electrical tension U to the metallized contact areas 21 of the structure (see, Fig. 4). Due to the using current flow it comes to a jouleschen heating up of the hydrogenated hafnium layer 2, which initiates the zuendvorgang in the directly resting upon pyrotechnic layer 5 on it by its heating up and the chemical decomposition (release of reactive hydrogen) and a plasma unloading (Fig. 5).

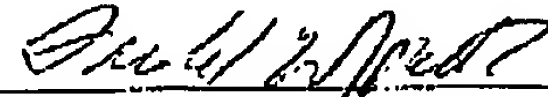
---

DATA supplied from the DATA cousin esp@cenet - Worldwide

-11-

Each of the stated grounds of rejection have been addressed or traversed. Reconsideration and re-examination of the pending claims is respectfully requested.

Respectfully submitted,



Frederick A. Spach  
Registration No. 33,793  
Attorney for Applicant

Cantor Colburn LLP  
55 Griffin Road South  
Bloomfield, CT 06002  
Customer No. 23413  
Telephone: (860) 286-2929  
Facsimile: (860) 286-0115